Product Customisation: Virtual Reality and New Opportunities for Luxury Brands Online Trading

Samar Altarteer
Dar Al-Hekma University
Jeddah, 22246 -4872, KSA
Samaraltarteer@gmail.com

Vassilis Charissis
Glasgow Caledonian University
Glasgow, G4 0BA, UK
V.charissis@gmail.com

David Harrison
Glasgow Caledonian University
Glasgow, G4 0BA, UK
D.K.Harrison@gcu.ac.uk

Warren Chan
Glasgow Caledonian University
Glasgow, G4 0BA, UK
Warren.chan@gcu.ac.uk

***Abstract*— Considering the rapid fast advancement in hardware and software medium technologies, product visualisation and customisation methods in online stores are evidently lacking both realism and interactivity. The advantages that Virtual Reality system makes available by means of high level of product visualisation and real time interaction can elevate the customer experience in the distance-shopping environment. This technology opens great opportunity for luxury names to engage customers into the experience and maintain the distinctive level of services provided across different channels. Comparing Virtual Reality and still images visualisation systems for product customisation in digital luxury brands stores, the current study reveals preferences of the Virtual Reality system over the existing methods. Empirical evidence shows that the perceived experience value of the VR system was also superior to the other system with higher attitudes toward the system for the luxury brands e-commerce sector.**

***Index Terms*—Virtual Reality simulation- Luxury Brands- Interactive interface- semi-immersive experience- Product visualisation- hand gesture.**

1. INTRODUCTION

Exerting continuous and great effort in providing value to customers is a major aspect in the growth of the Luxury companies [Knowledge 2008]. Luxury brands like Herme`s, Louis Vuitton, Chanel, Gucci, Dior and Ferragamo, approach different procedures in expressing the brand heritage and offer Know-How experience in online stores in order to convey a luxury experience [Maman Larraufie and Kourdoughli 2014]. However, other signs and indications of luxury like rarity, accessibility and visual emotion are not expressed in these stations [Maman Larraufie and Kourdoughli 2014]. Hence, there is a challenge for the experience and the interface design to compensate for the lack of direct interaction and explicit luxury experience. This dictates the need for exceptional facilities that are not readily available through conventional technology. This is consistent with [Kapferer 2012], who suggest that in order for luxury brands to thrive on the online stations, a multisensory experience has to be delivered. This multisensory experience should involve the high-task and low-task related factors to satisfy the customers' demands in the online stores.

In order to deliver a typical service for luxury brands, this work investigates the effectiveness of developing a novel three-dimensional VR HCI interface that could facilitate e-purchasing and the e-store journey in general. The main objective of this research is to utilise VR technology in order to deliver an inclusive experience to luxury brand customers. In addition, the proposed system encompasses product customisation capacity to enable the user to participate in the design process and allow for even higher levels of interactivity and engagement. The interaction with the interface is accomplished through hand gesture, presented through 3D-capable TV sets.

The rest of the paper organized as follows. The next section offers a brief overview of the proposed interface design and outlines its main features and functionality. The succeeding section discusses online stores issues and the benefits in integrating VR systems. Subsequently, section 4 presents the proposed VR system followed by section 5 demonstrates the experiment design. Sections 6, 7 and 8 discuss the system evaluation, results and conclusion respectively.

2. BACKGROUND

2.1. VR in Online Stores

VR has proved its efficiency and worth in several sectors such as education, healthcare and others. In fact, the attributes of an

interactive 3D product visualisation such as the level of control, synchronous and two-way communication (real time response) can cognitively involve customers online [Lee 2012]. The interactivity provided in a website through VR might offer extra advantages to customers since it provides information customisation, image manipulation, communication facilities and entertainment [Fiore et al. 2005]. Further, the 3D visualisation of the product enhances the utilitarian value represented by enhancing the consumer's awareness of the product's features, attributes and characteristics [Fiore et al. 2005 and Kim and Forsythe 2007] and improving customer involvement in the experience [Kim and Forsythe 2007].

In addition, [Algharabat and Zamil 2013] study results show a strong impact of the 3D information and system quality on the trust and satisfaction of the users, which in turn influence the users' intention to purchase. One the other hand, the perceived hedonic value in 3D product visualisation is superior to the capability of utilitarian value creation [Fiore et al. 2005].

2.2. Luxury Brands Online and Customer Satisfaction

The informal exchange of information through website technology has imposed the necessity of expressive web systems in a way that addresses a functional and attractive e-store wrapped in a luxurious atmosphere. Luxury website current strategies, however, are not portraying the full image in a balanced way. Replicating the luxury brand image online through visual emotions is not really emphasised as the balance between visually exposing the customer to the brand and trivialising the brand is critical [Maman Larraufie and Kourdoughli 2014]. The attitudes towards luxury brands e-store is determined by different aspects such as the web design, task-related factor including product information and the convenience in terms of the time and effort exerted [Kim et al. 2015]. Determining the service quality in these websites, however, is effected by the responsiveness, efficiency, fulfilment, contact, website design, and product information quality provided [Türk et at. 2012], in which the last two have direct influence on the perceived quality of luxury brands' online experience [Türk et at. 2012]. It has been observed that, in the online environment, the luxury customers behave differently from the offline stores, as they tend to be fascinated by the offers and the experience the brand offer online [Dauriz et al. 2014].

2.3. Perceived Experience Value in Luxury Brands Online Stores

Luxury brands provide their customers with more than functional value [Türk et at. 2012]. Experience and luxury are closely-related values, as the luxury value is achieved in an experiential manner. Customers tend to be attracted by the experience luxury brands provide online [Okonkwo 2010]. The perceived value of the experience or customer value is defined by "*interactive relativistic preference experience*" [Dauriz et al. 2014]. This means that the experience value results from the interaction with the brand and service provided and generates user preferences. This preference is represented in the perception of the hedonic, emotional and aesthetic values as well as the cognitive and the physical ones [NI 2011]. Previous researchers characterize the online experience by the total impact the customer obtains from the web station visit, which is formed by the overall mixture of emotions, ideas, and some web features such as optical attractiveness and functional elements [Huynh 2012]. Designing the user experience for online store takes into consideration all the interface elements including the brand, interface layout, text, sound, visual designs and interaction methods [Rose et al 2012]. In fact, the perceived user experience is a multi-dimensional construct. Previous study argue that the experiential value generates extrinsic benefit derives from utilitarian shopping and intrinsic benefit derives from the appreciation of the experience irrespective of utilitarian outcome [Mathwick et al. 2011]. This is partly consistent with [Rose et al 2012], who found that emotions played a significant role in user experience. It was concluded that the perceived experience value is highly subjective; it is a consequence of fun and playfulness more than task completion [Rose et al 2012]. To this end, providing immersive experience to customers in luxury brands online shopping environment that serve utilitarian and hedonic values deemed essential.

2.4. Luxury Brands Online and Product customisation

Luxury brands have to work more at building a solid relationship with customers by maintaining a high level of interaction with them, creating dialogue and communication as well as collaborating with the customer in co-creation and customisation of products [Okonkwo 2010]. Using innovative digital tools could support the establishment and the maintenance of the brand image in such a distant world [Dauriz et al. 2014]. It allows product co-creation and 3D product prototyping, which can expand operations functions [Dauriz et al. 2014]. Providing product customisation service offers the ability to adjust its features to meet the customers' particular requirements to assure a closer relationship with customers to satisfy their needs and enhance the client self-expression and engagement [Okonkwo 2010] in a relatively affordable technology. Hence, it drives traffic, creates demand and emphasises brand exclusivity [Li et al. 2001].

Using 3D visualisation is expected to offer an effective method of visualisation and interaction that will enhance the characteristics and the features of products in the consumers' conception. Previous study emphasise vivid, involving, affective and active as being the main psychological conditions that the user experiences during his/her interaction with a 3D object in a Virtual Environment [Mahdjoubi et al. 2014]. Through this kind of reality, customising and personalising the product enhances the learning process in an entertaining and engaging environment [Mujber et al. 2004] in a way that is expected to formulate an exclusive and exceptional experience.

3. VR SEMI-IMMERSIVE SYSTEM

This study proposes a Virtual Reality (VR) interface that optimizes the product visualisation experience in digital stations. The intention behind the system is to enable the prospective user to obtain more comprehensible and clearer information through a real-time Three-Dimensional (3D) examination of realistic and life-like virtual models (travelling bags) inside out, in a way that

is highly interactive and involving (360 rotations and zooming). Furthermore, customisation capacity for product features is provided within this system.

3.1. Different Levels of VR Systems

The emergence of advanced technologies in an online shopping environment, such as Virtual Reality (VR) systems has its impacts on the shopping experience. In fact, the factors that determine the perceived presence of VR experience and perceived experience value can vary, partially because these environments can have different characteristics and different levels. Besides the significant responsibility of the 3D graphic quality in enhancing the perceived presence and users' attitudes accordingly, other factors also contribute to immersing the user in the VR experience. VR systems have been categorised technologically into different levels where the variations attributed to the different technologies are integrated to deliver the system and consequently, the level of interactivity, immersion, presence and other perceptual values to the users. According to [MCMahan et al. 2012], the three main categories of VR systems are: Non-immersive VR that provides limited level of interactivity with the 3D object in the VE as well as limited visualisation capability in terms of display size and quality; Semi-immersive VR that consists of a relatively high-performance graphic computer system, displayed stereoscopically and the interaction accomplished through different methods like tracking body movements, remote control devices or gloves; and finally, fully immersive VR or Head-Mounted-Display system in which the user navigates in the virtual environment through head movements often with the support of data-gloves. To this end, the adoption of different levels of interaction fidelity with different levels of display fidelity generates different levels of perceived usability, engagement and presence in VR experience [Clemente et al. 2014]. Several studies conducted to understand the impact of different combinations of display fidelity and interaction fidelity on the perceived presence revealed that high level of both display and interaction methods results in greater presence [George and Mallery 2003].

3.2. System Rational

The usage of the stereoscopic visual display monitor in a typical restriction-free living room, where the use of desktop devices might not be the ultimate solution, is expected to have an influence on the customer's perceived experiential value. A restriction-free online shopping scenario could offer customers a high level of product display and life-like 1-1 item scale presentation. A 3D projector and head tracker were use in the current study. 3D glasses in this case are required to interpret the data.

The interaction with this style of interface could possibly be delivered in a natural manner, where no desk-based devices or wires are required to interact with the interface. Remote interaction with the interface and manipulation of the 3D products can be executed by means of wireless and gesture recognition mouse. However, the system is also designed to adapt to lower display and interaction settings like using regular desktop and mouse.

3.3. Interface Design

The main column in developing the interface is the user; that is, the goal, desires and preferences of the target user. Intensive research on the online shopping behavior and requirements, luxury brands customers' motivations and demands as well as analysis for the current trends in luxury online stores was an essential part in developing the system.

A pilot study was conducted to test the initial design in user trial sessions [Altarteer et al. 2013]. The results of the pilot study utilised in developing the beta version of the system. The main findings of the pilot study led to enhancement in the interactivity level with the product and the amount of the obtained information about the product.

The objective of the system is to provide users with the highest possible level of product visualisation and direct real-time interaction with the product whilst providing a simple yet effective interface to customise the product. The system comprises the design of a virtual 3D model of a travelling bag illustrated all of the exterior and the interior details including compartments, accessories and fine material characteristics (Figure 1, 2).

Fig. 1. The 3D model of the bag in the three selected materials.

Fig. 2. Details of the top, bottom, right, back and left sides of the 3D bag model.

Various alignments for the interface were developed and tested in usability studies striving for minimalist yet effective interaction process and immersive experience. The resulted interface menu is

linear, represented in five customisation phases, where the user transferred from one to another after determining and visualizing all of the product characteristics progressively. The menu design utilised most of the screen space for the product visualisation and allowed more space for efficient hand interaction. Further advantage of the linear menu is that it navigates the user to all of the options available for product customisation.

The interface provides 3D responsive visualisation of the bag by directly presenting alternatives or options available on the 3D product itself. Figure 3 shows the options for the materials available within the system.

Fig. 3. Interface design, sub-menu options (Material).

The choices in each phase are updated in real time accordingly. The user picks the design of the bag first, and then the available materials for this specific design are presented. Hardware options then can be selected and finally personalizing the bag with initials and strips in different colors is the last stage in the bag customisation process (Figure 4).

Fig. 4. Interface design, sub-menu options (Personalization).

The selection can be accomplished either by means of the GUI elements placed by the sides of the screen or by sliding pages. A progress indication bar should inform the user about the current phase and the accomplished process.

Once the user selects one of the options, the selected bag will be isolated (Figure 5). At this level, full control over the bag is available (rotation, zoom) as well as the ability to open the bag compartments and the interior part for maximum product investigation. GUI elements are provided for bag opening in addition to descriptive text about the features and elements added so far to the final product.

Fig. 5. 3D Product isolation mode. Direct manipulation of the product can be accomplished directly by placing the mouse cursor over the 3D model of the product. GUI elements on the left hand side of the screen under the Open button provided to investigate inside the bag and the inner parts of the compartments if applicable.

4. EXPERIMENT DESIGN

Representative users were involved in the early stages of system development in order to provide insights into the system's interactions and usability in the context of online luxury stores.

A comparative study was carried out in order to evaluate attitudes towards the 3D VR system against the existing 2D system online with regards to product customisation. A within-subject design is used involving 33 representative users (luxury brands customers) to participate in user trails sessions. A website for luxury brand that offers online product personalization service is selected and the same brand and product were used in the VR system with the intention of controlling variables.

The first study for testing and evaluating the VR system was carried out in the Virtual Reality Simulation Lab in Glasgow Caledonian University in order to strictly control variables with regards to environmental and experimental sitting to obtain accurate results. Even more, although conducting the study in the lab limited the participant's number in addition to the difficulty in involving representative users, it was extremely useful for observing the users and gathering objective information.

The second study utilized an existing brand interface. Hence all of the users in the pre-test questionnaire confirmed familiarity with online shopping; the study conducted online, two weeks after testing the VR system.

Users were provided with customisation and personalization tasks to accomplish in both systems, which should help in generating comprehensive image about the system as well as allowing adequate product investigation.

Pre-test questionnaire used to collect demographic information as well as information regards previous experience with technology, online shopping and luxury brands.

Directly after conducting the experiment, the users completed a post-test questionnaire regarding their experiences with the system.

5. SYSTEM EVALUATION

Introduction of new technologies is commonly associated with concern regarding the users' attitude and their acceptance of the

technology. Therefore, it requires a comprehensive examination of its potential acceptance by customers, not only as a useful tool within the specific context of online shopping but also, more importantly, as a unique experience concordant with the luxury image and expectations.

Measuring the perceived experience value is this study followed Mathwick model [15]. It is evaluated through three antecedents: playfulness, aesthetics and customer return on investment. The playfulness construct is defined by means of the intrinsic enjoyment and escapism, with enjoyment defined as the potential entertainment of the experience and escapism referring to the psychological state of being absorbed in the experience [15]. The aesthetic construct is represented in the prominent visual element of the store environment and the dramatic or the entertaining nature of the service performance. Thirdly, there is the customer return on any form of investment, be it financial, time-related, behavioral or psychological. Eighteen items in total were developed to measure the perceived experience value: 6 items for playfulness, 2 items for customer return on investment and 8 items for aesthetic.

The questionnaire also measures the product customisation feature in luxury online stored using 2 items. The perceived experience value of visualisation system is measured using 9 items. Finally, the attitude toward the system within the context of online luxury stores was measured using six items. Observation data for the users during the user trials were documented. The questionnaire included positive statements, with responses were on a scale ranging from Strongly disagree = 0, Disagree = 1, Neutral = 2, Agree = 3 and Strongly agree = 4.

6. RESULTS

6.1. Reliability, Normality and Descriptive Statistics

To measure the reliability of the questionnaire, the mean of each construct in the questionnaire was assessed for reliability using Cronbach's Alpha.

Construct	# of items	Cronbach's Alpha (2D images)	Cronbach's Alpha (VR)
Product customisation (PC)	2	.916	.841
Experience Value (EV)	18	.975	.921
Attitude toward the system (A)	6	.857	.879

Table. 1. Cronbach's Alpha for 2D static images and 3D VR systems.

As shown in Table 1, all of the constructs when tested for reliability revealed excellent p-values (over 0.8 α values) indicating excellent internal consistency [25].

The procedure adopted in this study to assess data normality was the Shapiro-Wilk test and the calculation of the z-value based on the skewness and kurtosis values.

The z-values of all of the constructs for the VR system were between 1.96 and +1.96 at 0.05. This means that all of the data under all of the constructs are normally distributed (Table 2).

Construct	Mean	Std.D	Kurtosis		Skewness		z-value
	Statistic	Statistic	Statistic	Error	Statistic	Error	
2D static images system							
PC	2.13	1.01760	-.397	.798	-.040	.409	-0.09
EV	2.55	1.09616	-.640	.798	-.593	.409	-1.44
A	2.69	.87313	-.611	.798	-.530	.409	-1.29
3D VR system							
PC	3.3214	.60306	-1.003	.717	-.353	.365	-0.96
EV	3.3534	.45856	-.358	.717	-.630	.365	-1.72
A	3.3810	.57061	-1.057	.717	-.547	.365	-1.49

Table. 2. Mean, kurtosis, skewness and z-value for the mean of construct in the 2D static images and 3D VR systems.

However, based on Shapiro-Wilk test, two constructs in each system revealed a p-value <0.05, meaning that there was not enough evidence to accept the null hypothesis (Table 3). Product customisation construct in the 2D images system and the perceived experience value in the 3D VR system revealed a p-value >0.05. To this end, not all of the data are normally distributed. Therefore, non-parametric tests were used in this study.

System	Construct	Shapiro-Wilk		
		Statistic	df	Sig.
2D images	PC	.961	33	.283
	EV	.933	33	.043
	A	.927	33	.029
3D VR	PC	.911	33	.010
	EV	.937	33	.054
	A	.892	33	.003

Table. 3. Test for normality for the 2D static images and 3D VR systems' constructs.

6.2. Comparative Test

The most commonly adopted paired-sample nonparametric test is the Wilcoxon signed-rank, which was used for conducting this comparative study. The Wilcoxon signed-ranks test indicated that VR system perceived experience value (Z=- 3.142, p= 0.002), product customisation (Z=- 4.307, p= 0.000), and the attitudes (Z=- 3.271, p= 0.001) are all significantly higher than the corresponding constructs in the 2D static images system.

Ranks (z-value based on negative value)				
		N	Mean Rank	Sum of Ranks
VR Attitudes -2D images Attitudes	Negative Ranks	9a	7.44	67.00
	Positive Ranks	20b	18.40	368.00
	Ties	4c		
	Total	33		
VR perceived experience value -2D images perceived experience value	Negative Ranks	11d	8.73	96.00
	Positive Ranks	21e	20.57	432.00
	Ties	1f		
	Total	33		
Product customisation-2D images Product customisation	Negative Ranks	2p	5.00	10.00
	Positive Ranks	25q	14.72	368.00
	Ties	6r		

	Total	33		

a. 3D VR Attitudes < 2D images Attitudes
b. 3D VR Attitudes > 2D images Attitudes
c. 3D VR Attitudes = 2D images Attitudes
d. 3D VR Perceived experience value < 2D images Experience value
e. 3D VR Perceived experience value > 2D images Experience value
f. 3D VR Perceived experience value = 2D images Perceived experience value
p. 3D VR Product customisation < 2D images Product customisation
q. 3D VR Product customisation > 2D images Product customisation
r. 3D VR Product customisation = 2D images Product customisation

Table. 4. Wilcoxon signed-rank test for 3D VR system and 2D static images comparison (SPSS).

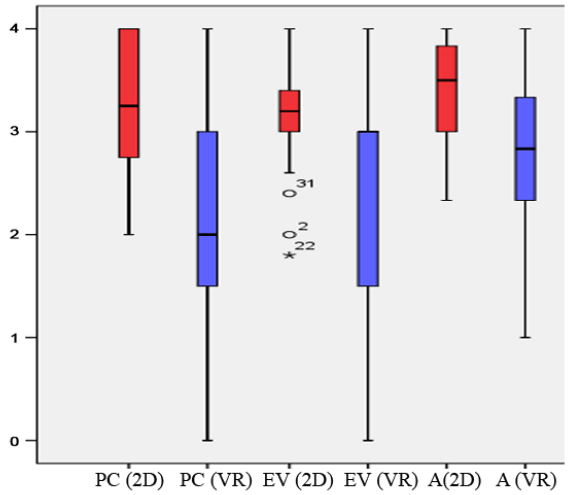

Fig. 6. Wilcoxon signed-rank test for 3D VR system and 2D static images comparison.

Also, comparing the mean (Table 2) reveals that the 3D VR system has exceeded the 2D static image system in all constructs.

7. Discussion and Conclusion

The study presented in the current paper proposed a 3D VR system for online luxury brands stores. The objectives of this system is to immerse the customer or the user into the experience by enriching the visual information of the product and utilizing the advantages that VR system can offer to build effective real-time customisation service. In addition, the nature of VR systems enhances intrinsic values in addition to utilitarian values and in return makes a direct impact on the perceived experience value within luxury e-stores context.

Through the comparative study, a significant difference between the 3D VR system and 2D static images system for luxury brands e-commerce emerged. This difference in experience and preference was in favor of the 3D VR system. With the 3D VR system attitudes, perceived experience value and product customisation capacity were significantly higher than those relating to 2D static image systems. The attitude

3D V systems supported better understanding of the product during the customisation process and allowed greater control over the product features.

The method implemented in the 3D VR system was more attractive, pleasing, motivating and enjoyable throughout the experience more than what 2D static images do for the customers.

The attitude towards the VR systems for product customisation is superior to the conventional 2D images when shopping luxury products online and consistent with the expectation from such companies.

To this end, the prototype 3D VR system has significantly proved its efficiency in enriching the customer experience in online luxury stores compared with the 2D static images, in a way that is highly interactive, replete with visual and sensory cues/information and smoothly immersive.

8. References

[1] ALGHARABAT, R. S. & ZAMIL, A. M. A. (2013). An empirical investigation of 3D-based information systems success for online retailers. International Journal of Technology Marketing, 8, 316-336.

[2] Altarteer, S., Charissis, V., Harrison, D. & Chan, W. (2013). Interactive Virtual Reality Shopping and the Impact in Luxury Brands. Virtual, Augmented and Mixed Reality. Systems and Applications. Springer Berlin Heidelberg. pp 221-230.

[3] CLEMENTE, M., REY, B., RODRÍGUEZ-PUJADAS, A., BARROS-LOSCERTALES, A., BAÑOS, R. M., BOTELLA, C., ALCAÑIZ, M. & ÁVILA, C. (2014). An fMRI study to analyze neural correlates of presence during virtual reality experiences. Interacting with Computers, 26, 269-284.

[4] DAURIZ, L., MICHETTI, A., SANDRI, N. & ZOCCHI, A. (2014). Digital luxury experience 2013: Keeping up with changing customers. McKinsey & Company. Italy.

[5] FIORE, A. M., KIM, J. & LEE, H. H. (2005). Effect of image interactivity technology on consumer responses toward the online retailer. Journal of Interactive Marketing, 19, 38-53.

[6] GEORGE, D. & MALLERY, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update. Allyn & Bacon. Boston, USA.

[7] HUYNH, P. T. (2012). Effects of Web 2.0 experience on consumers' online purchase intention: The social networking and interaction orientation factors. Auckland University of Technology.

[8] KAPFERER, J. N. (2012). The luxury strategy: Break the rules of marketing to build luxury brands, Kogan Page Publishers.

[9] KIM, H., CHOI, Y. J., LEE, Y., HAYES, S. & TAYLOR, G. (2015). Web atmospheric qualities in luxury fashion brand websites. Journal of Fashion Marketing and Management: An International Journal, 19.

[10] KIM, J. & FORSYTHE, S. (2007). Hedonic usage of product virtualization technologies in online apparel shopping. International Journal of Retail & Distribution Management, 35, 502-514.

[11] KNOWLEDGE (2008). Luxury brands: Marketing the upscale during a downturn. Knowledge @Wharton. University of Pennsylvania: The Wharton School.

[12] LEE, K. Y. (2012). Consumer processing of virtual experience in e-commerce: A test of an integrated framework. Computers in Human Behavior, 28, 2134-2142.

[13] LI, H., DAUGHERTY, T. & BIOCCA, F. (2001). Characteristics of virtual experience in electronic commerce: A protocol analysis. Journal of Interactive Marketing, 15, 13-30.

[14] MAHDJOUBI, L., HAO KOH, J. & MOOBELA, C. (2014). Effects of Interactive Real-Time Simulations and Humanoid Avatars on Consumers' Responses in Online House Products Marketing. Computer-Aided Civil and Infrastructure Engineering, 29, 31-46.

[15] MAMAN LARRAUFIE, A. F. & KOURDOUGHLI, A. (2014). The e-semiotics of luxury. Journal of Global Fashion Marketing, 5, 197-208.

[16] MATHWICK, C., MALHOTRA, N. & RIGDON, E. (2001). Experiential value: Conceptualization, measurement and application in the catalog and Internet shopping environment. Journal of Retailing, 77, 39-56.

[17] MCMAHAN, R. P., BOWMAN, D. A., ZIELINSKI, D. J. & BRADY, R. B. (2012). Evaluating display fidelity and interaction fidelity in a virtual reality game. IEEE Trans Vis Comput Graph, 18, 626-33.

[18] MUJBER, T. S., SZECSI, T. & HASHMI, M. S. (2004). Virtual reality applications in manufacturing process simulation. Journal of materials processing technology, 155, 1834-1838.

[19] NI, T. (2011). A framework of freehand gesture interaction: Techniques, guidelines, and applications. Virginia Polytechnic Institute and State University.

[20] OKONKWO, U. (2010). *Luxury online: Styles, systems, strategies*, Palgrave Macmillan.

[21] ROSE, S., CLARK, M., SAMOUEL, P. & HAIR, N. (2012). Online customer experience in e-retailing: An empirical model of antecedents and outcomes. Journal of Retailing, 88, 308-322.

[22] TÜRK, B., SCHOLZ, M. & BERRESHEIM, P. (2012). Measuring service quality in online luxury goods retailing. Journal of Electronic Commerce Research, 13, 88.